disposed on an inner surface. The groove is preferably formed to be decreasing in depth and width, so as the melt flows into the groove, it gradually spills out of the groove. As the melt travels through the helical groove, it is mixed and changes from circular flow to annular flow. The helical groove helps direct the melt around the back of the mixer which helps to eliminate stagnation points behind the flow obstruction while also providing uniform annular flow of the melt.

IN THE CLAIMS:

Please cancel claims 1-18, 22, and 25-34.

Please amend claims 19-21, 23, 24, and 42-44 as follows:

19. (amended) In an injection molding system, a flow mixer comprising:

a mixer bushing inserted in a bore of a hot runner manifold, the mixer bushing having a flow inlet communicating with a melt channel in the manifold, an exit oriented approximately perpendicular to the flow inlet, and an internal surface between the flow inlet and exit on which a helical channel is formed to communicate a flowing melt from the inlet to the exit;

a valve stem slidably inserted in said mixer bushing coaxially with the helical channel;

wherein in use, said flowing melt is transitioned from circular flow to annular flow as it travels from said inlet to said exit.

20. (amended) The flow mixer of claim 19, wherein said helical channel reduces in cross-sectional area in a direction from said inlet to said exit.

21. (amended) The flow mixer of claim 19 wherein said internal surface is tapered such that a gap between said helical channel and said valve stem gradually increases in a direction from said inlet to said outlet.

23. (amended) The flow mixer of claim 19, further comprising a locating pin for

maintaining alignment of said inlet to said melt channel.

24. (amended) The flow mixer of claim 19, further comprising a piston housing rigidly affixed to said mixer bushing, said piston housing containing a piston connected to a top distal end of said valve stem, said piston operative inside said piston housing to move said valve stem to start and stop flow of the melt through a nozzle outlet.

42. (amended) In an injection molding system having a heated hot runner manifold with a primary melt channel formed therein, an injection nozzle comprising;

a mixer bushing having a flow inlet, an exit oriented approximately perpendicular to the flow inlet, and an internal surface between the flow inlet and exit on which a helical channel is formed;

a nozzle body co-axially located around said mixer bushing and having a melt channel in fluid communication with said flow inlet and said primary melt channel; and

a movable valve stem inserted co-axially through said helical channel for selectively starting and stopping a flowing melt.

43. (amended) The injection nozzle of claim 42, wherein a gap between said helical channel and said valve stem gradually increases in a direction from said flow inlet to said exit.

44. (amended) The injection nozzle of claim 42, further comprising a locator affixed between said nozzle body and said mixer bushing thereby maintaining alignment of said melt channel to said flow inlet.

REMARKS

Claims 1-45 are presented for examination in this application. Claims 35-41 stand allowed, and the rest stand rejected.